

AMENDMENT TO THE CLAIMS:

This listing of claims will replace all prior versions of claims in the application:

LISTING OF CLAIMS:

- 1 1. (Currently amended) A magnetic sensor, comprising  
2 a first magnetic shield layer, having a raised portion and first and second  
3 laterally opposed recessed portions extending laterally there from;  
4 a magnetoresistive sensor formed above said raised portion of said first  
5 magnetic shield layer, said magnetoresistive sensor having an anti-parallel  
6 coupled self pinned layer, and having a free magnetic layer; ~~and~~  
7 first and second compressive layers formed above said first and second  
8 recessed portions of said shield; and  
first and second hard magnetic bias layers formed above said first and second  
compressive layers; and  
third and fourth compressive layers comprising Rh formed above said first and  
second hard bias layers.
- 1 2. (Original) A magnetic sensor as in claim 1, wherein said anti-parallel pinned  
2 layer includes first and second ferromagnetic layers having a positive  
3 magnetostriction separated by anti-parallel coupling layer, and wherein pinning of  
4 said self pinned layer is assisted by a combination of magnetostriction and  
5 magnetostatic coupling between said first and second ferromagnetic layers.

1 3. (Original) A magnetic sensor as in claim 1, wherein said self pinned layer is  
2 pinned without the assistance of exchange coupling to an antiferromagnetic  
3 material.

1 4. (Cancelled)

1 5. (Cancelled) A magnetic sensor as in claim 1 further comprising first and second  
2 layers of hard magnetic material formed over said first and second compressive  
3 layers, and first and second metallic layers formed over said first and second  
4 layers of hard magnetic material.

1 6. (Original) A magnetic sensor, comprising  
2 a first magnetic shield layer, having a raised portion and first and second  
3 laterally opposed recessed portions extending laterally there from;  
4 a magnetoresistive sensor formed above said raised portion of said first  
5 magnetic shield layer, said magnetoresistive sensor having an anti-parallel  
6 coupled self pinned layer, and having a free magnetic layer;  
7 first and second compressive layers formed above said first and second  
8 recessed portions of said shield;  
9 first and second layers of hard magnetic material formed over said first and  
10 second compressive layers; and

11           first and second metallic layers comprising Rh formed over said first and  
12           second layers of hard magnetic material

13           ~~A magnetic sensor as in claim 5 wherein said first and second metallic layers~~  
14           ~~comprise Rh.~~

1     7.     (Original) A magnetic sensor as in claim 1 further comprising first and second  
2           hard magnetic layers formed above said recessed portions of said shield, said first  
3           and second hard magnetic material layers comprising CoPt, and further  
4           comprising first and second CrMo seed layers.

1     8.     (Original) A magnetic sensor as in claim 1 further comprising first and second  
2           hard magnetic layers formed above said recessed portions of said shield, said first  
3           and second hard magnetic material layers comprising CoPtCr and further  
4           comprising first and second Cr seed layers.

1     9.     (Original) A magnetic sensor as in claim 1 wherein said first and second  
2           compressive layers each have a thickness of at least 200 angstroms.

1     10.    (Original) A magnetic sensor as in claim 1 wherein said first and second  
2           compressive layers each have a thickness of at least 750 angstroms.

1     11.    (Original) A magnetic sensor as in claim 1 further comprising an insulating layer  
2           disposed between said anti-parallel pinned layer and said free magnetic layer.

- 1 12. (Original) A magnetic sensor as in claim 1 further comprising an electrically  
2 conductive layer disposed between said anti-parallel pinned layer and said free  
3 magnetic layer.
- 1 13. (Original) A magnetic sensor as in claim 1 wherein said first and second  
2 ferromagnetic layers comprise a material having a positive magnetostriction.
- 1 14. (Original) A magnetic sensor as in claim 1 wherein said shield layer is in  
2 electrical communication with said anti-parallel pinned layer.
- 1 15. (Original) A magnetic sensor as in claim 1 further comprising an electrically  
2 insulating layer disposed between said shield and said anti-parallel pinned layer.
- 1 16. (Original) A magnetic sensor as in claim 1 wherein at least one of said  
2 ferromagnetic layers of said pinned layer comprises CoFe.
- 1 17. (Original) A magnetic sensor as in claim 1 wherein said first and second  
2 compressive layers have a thickness of at least 17 angstroms.
- 1 18. (Cancelled)
- 1 19. (Cancelled)

1     20.     (Currently Amended) A data storage system, comprising:  
2             a housing  
3             a motor connected with said housing;  
4             a spindle connected with said motor;  
5             a magnetic disk supported upon said spindle for rotation about its own axis;  
6             an actuator; and  
7             a slider supported by said actuator for pivotal motion across a surface of said disk;  
8             a magnetic sensor formed on said slider, said magnetic sensor comprising:  
9                 a first magnetic shield layer, having a raised portion and first and second  
10                 laterally opposed lower portions extending laterally there from;  
11                 a magnetoresistive sensor formed above said raised portion of said first  
12                 magnetic shield layer, said magnetoresistive sensor having an anti-parallel  
13                 coupled self pinned layer, and having a free magnetic layer; and  
               a first and second compressive layers comprising Rh formed above said first  
                                 and second laterally opposed lower portions of said shield.

1     21.     (Previously presented) A magnetic sensor, comprising  
2             a first magnetic shield layer, having a raised portion and first and second  
3             laterally opposed recessed portions extending laterally there from;  
4             a magnetoresistive sensor formed above said raised portion of said first  
5             magnetic shield layer, said magnetoresistive sensor having an anti-parallel  
6             coupled self pinned layer, and having a free magnetic layer; and

7 first and second compressive layers comprising Cu formed above said first  
8 and second recessed portions of said shield.

1 22. (New) A magnetic sensor, comprising  
2 a first magnetic shield layer, having a raised portion and first and second  
3 laterally opposed recessed portions extending laterally there from;  
4 a magnetoresistive sensor formed above said raised portion of said first  
5 magnetic shield layer, said magnetoresistive sensor having an anti-parallel  
6 coupled self pinned layer, and having a free magnetic layer; and  
7 first and second compressive layers comprising Rh formed above said first  
8 and second recessed portions of said shield.